RECENT ADDITIONS TO THE ALIEN MARINE BIOTA ALONG ITALIAN COASTS

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Abstract
New records of non-indigenous species along the Italian coasts have been reported, amounting to a total of 176, which includes suspected cryptogenic species. Many species have shown range expansion especially in the lagoon of Venice and the area surrounding Olbia (NE Sardinia).

Keywords: Tyrrhenian Sea, North Adriatic Sea, Ionian Sea, Alien species

Introduction - Target 5 of the EU Biodiversity Strategy (2011) [1] states that European countries are committed to identifying Invasive Alien Species (IAS) and their pathways by 2020, in order to develop management strategies able to control and prevent introduction and establishment of new IAS. Furthermore, in 2008 the Marine Strategy Framework Directive [2] included the presence and relative abundance of non-indigenous species (NIS) as one of the main descriptors in assessing Good Environmental Status (GES) in European marine waters. The production of validated lists of alien species and their continuous updating is therefore a crucial instrument for member states to meet the commitments towards the EU. As regards Italian coasts, a comprehensive report of multicellular NIS introduced in the period 1945-2009 was published in 2011 [3], and a focus on the hotspots of introduction and pathways was also presented [4]. Since then, new literature records have shown the presence of additional NIS or suspected cryptogenic species, as well as the range expansion of previously recorded ones. This paper offers a summary of the new records, providing an update of the presence of NIS along the Italian coast and indicating the main hotspots of introduction.

Methods - Data were extracted from AquaNIS (Information system on Aquatic non-Indigenous species)
Version: 2.0 (http://www.corpi.ku.lt/databases/index.php/aquanis).

Results - Twelve NIS, which are new to the Italian fauna, have been recorded since the publication of the list in 2011 [3] (in brackets the year of first Italian record): the macroalgae *Caulerpa taxifolia* var *distichophylla* (2008), *Gracilaria vermiculophylla* (2008), *Heterosyphonia japonica* (1999), *Hypnea flexicaulis* (2009), *Solieria filiformis* (2005), the digenean parasite *Allolepidapedon fistulariae* (2005), the polychaetes *Branchiomma bairdi* (2004), *Hesionura serrata* (2010), the crustaceans *Artemia franciscana* (2003), *Charybdis japonica* (2006), *Pseudodiaptomus marinus* (2011), and the ascidian *Didemnum vexillum* (2007). Conversely, we have not considered several recent literature records that might refer to cryptogenic species: the macroalga *Palisada maris-rubri* (1991), the deep-sea polychaete *Harmothoë vesiculosa* (2000), the ascidian *Botrylloides pizoni* n.sp., recently reported from Mar Piccolo, Taranto (2003) but likely to have originated outside the Mediterranean area. These species would require evidence from genetic analyses in order to clarify their native origin. Other species that had previously been reported in Italy have reached new regions of the Italian coastline. Most of the recent range expansions involve the lagoon of Venice (V), the Mar Piccolo of Taranto (T) and the NE coast of Sardinia, namely around Olbia (O), whereas a number of other records occurred elsewhere in Italy (E): the macroalgae *Agardhiella subulata* (V), *Aglaothamnion feldmanniae* (V), *Grateloupia turuturu* (T), the molluscs *Anadara transversa* (O), *Brachidontes pharaonis* (O), *Bursatella leachii* (O), *Crassostrea gigas* (O), *Fulvia (Fulvia) fragilis* (O), *Haminoea japonica* (E), *Polycera hedgpethi* (V), the peracarid *Caprella scaura* (T), and the bryozoans *Electra tenella* (E), *Tricellaria inopinata* (O).

Discussion & Conclusions - A former analysis of the geographical distribution of introduction events in Italy [4] had highlighted the lagoon of Venice as the main hotspot of alien species introduction, with 40 alien species introduced since 1945. The number of aliens has now increased, reaching 48, and confirms that the lagoon of Venice is an optimal site for the introduction and establishment of alien organisms. Venice also represents an important source of secondary spread of alien species by means of shipping and aquaculture activities. In particular, the transfer from Venice of live molluscs for farming has been suggested as the most likely vector, explaining the recent appearance of several alien species in the harbour of Olbia [6]. Olbia is now to be added to the list of Italian hotspots of introduction (Fig.1), displaying 12 introduced species. The updated total number of marine NIS introduced to Italy now stands at 176, but it is currently under verification as it is suspected to include a number of cryptogenic species. Eventually, the total number of NIS along the Italian coast is likely to be lower.

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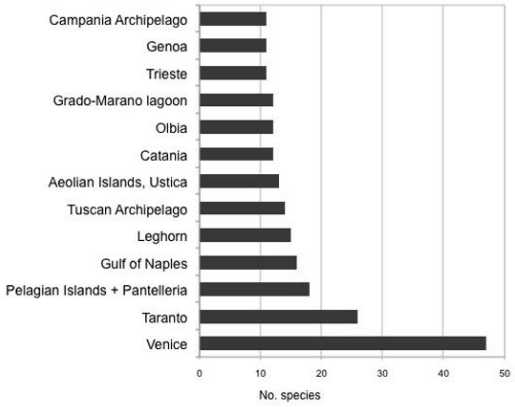

Fig. 1. Hotspots of introduction along the Italian coasts (only localities with more than 10 alien species recorded).

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